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EXAMINER

BAREFORD, KATHERINE A

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/856,335

Applicant(s)

LUGSCHEIDER, ERICH

Examiner

Katherine A. Bareford

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 2-9, 15-21, 23, 25-27, 29-31 and 39-41 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 10, 12, 14, 28, 32, 34, 35, 37 and 38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.
- Claims 11, 13, 22, 24, 33 and 36 are canceled*

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment of Feb. 10, 2006 has been received and entered.

As a result of this amendment, claims 2-9, 15-21, 23, 25-27 and 29-31 remain withdrawn. Claims 11, 13, 22, 24, 33 and 36 are canceled. Claims 1, 10, 12, 14, 28, 32, 34 and 35 remain pending for examination, and new claims 37-41 have been filed for examination.

Election/Restrictions

2. Newly submitted claims 39-41 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: (1) claim 39 requires diagnosis of a particle temperature, particle speed and particle size. However, in the restriction requirement of April 5, 2002 a requirement of election of species was made as to the monitoring, and in the response of August 12, 2002, applicant elected monitoring of particle amount (claim 10). Therefore, the monitoring as in claim 39 is to a withdrawn species. (2) claim 40 requires determining a size and shape of individual particles. However, in the restriction requirement of April 5, 2002 a requirement of election of species was made as to the monitoring, and in the response of August 12, 2002, applicant elected monitoring of particle amount (claim 10). Therefore, the monitoring as in claim 40 is to a withdrawn species. (3) claim 41 requires the measured properties to include particle speed and particle temperature. However, in the

restriction requirement of April 5, 2002 a requirement of election of species was made as to the monitoring, and in the response of August 12, 2002, applicant elected monitoring of particle amount (claim 10). Therefore, the monitoring as in claim 41 is to a withdrawn species.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 39-41 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 10, 12, 14, 28, 32, 34 and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al (US 5143746) in view of Savkar et al (US 5047612) and Moreau et al (US 5180921).

Inoue teaches a process for producing a wear resistant layer on a substrate by spraying an iron oxide based material to the substrate. Column 1, lines 5-20. The material to be sprayed can be 100 percent magnetite. Column 2, lines 5-15, column 4,

lines 35-65 and column 5, lines 15-30. The material can be thermally sprayed by a plasma spraying process. Column 3, lines 50-68 and column 5, lines 30-68 (see the methods of Table 1 and 2). The material can be sprayed in the form of a powder. Column 4, lines 45-60 and column 5, lines 30-68 (see the particle sizes of Tables 1 and 2). The powder size can be 5-40 or 40-100 or 40-150 microns, for example. See column 5, lines 30-68 (see the particle sizes of Table 1 and 2). Because of the material sprayed and the layer provided the coating would inherently be corrosion resistant. The applied coating can be homogenous. Column 4, lines 1-10. The applied coating can be a thin layer of 150, 400 or 500 microns in thickness. See column 4, lines 45-60 and column 5, Table 2, Examples 1, 2 and 3, indicating a magnetite coating plasma sprayed to a thickness of about 150, 500 and 400 microns, respectively.

Claim 12: the spray process can be a water plasma spray process. Column 3, line 65 through column 4, line 2 and column 5, lines 30-68 (see the methods of Tables 1 and 2).

Claims 14, 28: the material can be 100 percent magnetite or pure magnetite. Column 2, lines 5-15, column 4, lines 35-65 and column 5, lines 15-30.

Claim 32: the powder size can be 5-40 or 40-100 microns, for example. See column 5, lines 30-68 (see the particle sizes of Table 1 and 2).

✓ Claim 3⁴~~5~~: The material can be sprayed by a plasma spraying process. Column 3, lines 50-68 and column 5, lines 30-68 (see the methods of Table 1 and 2).

10 Claims 37-38; the applied coating can be a thin layer of 150, 400 or 500 microns in thickness. See column 4, lines 45-60 and column 5, Table 2, Examples 1, 2 and 3, indicating a magnetite coating plasma sprayed to a thickness of about 150, 500 and 400 microns, respectively. 400 and 500 microns thickness would read on claim 37 (0.2 mm - 0.5 mm = 200 - 500 microns). 150 microns would read on claim 38.

Inoue teaches all the features of these claims except the on-line monitoring and control system (claim 1+), with monitoring of the amount of powder fed (claim 10).

However, Savkar teaches a method and apparatus for controlling the deposition of a powder in a plasma spray process, where the spray process is monitored by an on-line system. See column 1, lines 5-15 and 50-68. The system monitors the impact point of the material forming the layer of material on the substrate. See column 3, lines 15-30 and column 4, lines 45-60 and figure 1. The system also provides on-line monitoring and control of the powder feed rate to the plasma flame. See figure 1 and column 5, line 60 through column 6, line 15. This system provides for optimized deposition of the coating on the target substrate. See column 2, lines 15-50.

As well, Moreau teaches a method and apparatus for controlling the deposition of a powder in a plasma spray process, where the spray process is monitored by an on-line system. See column 1, lines 30-50 and figures 1-2. The system monitors direct process parameters of temperature and velocity of particles in the thermal spray immediately before their impact on the substrate. See column 1, lines 30-50. Moreau teaches that this allows an efficient feedback signal generator performing feedback for

the gun input parameters to maintain optimum spraying conditions. See column 1, lines 30-50. This system provides that it can be used in addition to measuring indirect gun input variables. See column 1, lines 30-40.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inoue to use both the on-line monitoring and control systems suggested by Savkar and Moreau in order to provide optimized deposition of the coating onto the substrate because Inoue teaches a plasma spray system of depositing magnetite onto a substrate surface and Savkar and Moreau teach the desirability of using on-line monitoring and control systems when plasma spraying in order to optimize the deposition of the coating. It would have been obvious to use both types of monitoring systems (Savkar provides for monitoring impact point, powder feed, carrier gas, etc., and Moreau provides for measuring particle temperature and velocity in the stream) simultaneously to provide maximum control of system variables because Savkar and Moreau teach the benefits of measuring various features of the spray system on-line and both teach that more than one type of process feature can be monitored (Savkar provides for monitoring impact point, powder feed, carrier gas, etc., and Moreau provides for measuring particle temperature and velocity in the stream and also indicates that other gun variables can be monitored).

5. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue in view of Savkar and Moreau as applied to claims 1, 10, 12, 14, 28, 32, 34 and 37-38 above, and further in view of Yoshinaka et al (US 5158643).

Inoue in view of Savkar and Moreau teaches all the features of this claim except the air as plasma gas. Inoue does teach that the spray coating is conducted in a neutral gas atmosphere not having an extreme oxidizing or reducing nature. See column 3, lines 50-55. For example, argon or mixtures of argon and nitrogen are used. See column 3, lines 55-60.

Yoshinaka teaches that when plasma spraying material, it is conventional known to provide plasma fueled by air, argon, hydrogen or helium, etc. see column 9, lines 45-55.

It would have been obvious to one of ordinary skill in the art to modify Inoue in view of Savkar and Moreau to use air as part of the plasma fuel gas as suggested by Yoshinaka with an expectation of desirable results, because Inoue in view of Savkar and Moreau teaches using a plasma gas such as argon/nitrogen to provide an atmosphere that is not of an extreme oxidizing or reducing nature, and Yoshinaka teaches that it is conventionally known to use air as part of plasma gas mixture. While air would be oxidizing, one of ordinary skill in the art would understand that it could be mixed with the described argon/nitrogen to provide a not "extreme" oxidizing mixture, which would allow for a more cost efficient gas.

6. The rejection of claim 36 under 35 U.S.C. 103(a) as being unpatentable over Inoue et al (US 5143746) in view of Moreau et al (US 5180921) is withdrawn due to the cancellation of claim 36 in the amendment of Feb. 10, 2006.

Response to Arguments

7. Applicant's arguments filed Feb. 10, 2006 have been fully considered but they are not persuasive.

Applicant's Arguments

Applicant argues that Inoue discloses formation of magnetite coatings having "thickness exceeding 300" microns with examples of 150, 400 and 500 microns.

Although technically overlapping the claims 1 and 37 ranges, applicant argues that the

103 teaches ^{IN 65} are toward thicker coatings outside the claim 38 range. According to

applicant, although the use of the presently claimed control system may produce

thicker layers within the Inoue range ^{it} may also produce thinner layers, ^{and that} ~~that~~ the

thickness ranges may overlap does not constitute a disclosure of or a suggestion to

adopt the presently claimed control methods, according to applicant, rather the limited

overlap is regarded as either teaching away from a need to adopt the present control

methods or an inability in the art to achieve the thin layers until the present control

methods, which identify and enable a broader range. As to depositing thin uniform

layers, applicant argues that this is a technically complex problem. If the spray

temperature is too low, particles will maintain their structure upon impact and will not

uniformly integrate. To provide thin layers, particle speed has to be relatively high (see present Example 4). With high speed deposition, the kinetic energy is transformed into thermal energy producing the melting. However, the high kinetic and total energy poses the risk of splashing creating surface irregularities rather than the uniform structure. It has been determined that with the on-line responsive control, the velocity and temperature may be carefully maintained effective to provide the thin layer uniformity. The teaching of Savkar is of passive control, i.e. an impact point of the powder is sensed and as a consequence the amount of carrier gas is regulated - however, there is no direct control with regard to properties of the spray such as velocity or temperature. Moreau teaches to monitor simultaneously the temperature and the velocity of spray particles. However, Moreau's teaching is not sufficiently specific as to purpose, material, etc. as to suggest the proposed combination. Moreau generally identifies providing a better reproducibility of coating properties or coating quality (Moreau, column 1, lines 48 - 51) rather than expanding the envelope of available prior art coating thicknesses. As to the rejection of claim 35, applicant further argues that the addition of Yoshinaka is merely more of a hindsight reconstruction against the teachings of the underlying references.

The Examiner's Response

The Examiner has reviewed these arguments, however, the rejections are maintained. As to the thicknesses taught by Inoue, each example is within the claimed

range. Examples 1, 2 and 3 (about 150, 500 and 400 microns thickness, respectively) are all within in the range of thickness of claim 1. The 400 and 500 microns thicknesses are also within the range of claim 37 and the 150 micron thickness within the range of claim 38. These inventive examples 1, 2 and 3 are clearly distinguished from the comparative example and thus are thickness contemplated by Inoue. Thus, the desire to spray a uniform thickness within the claimed range is clearly taught by Inoue. As to the online monitoring and control as claimed, as discussed in the rejection above, Savkar teaches the desirability of monitoring the layer of material applied during the spraying operation and Moreau teaches the desirability of monitoring the process parameters during spraying. Even if it applicant especially desires to have online monitoring to provide the thin layer, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Here, the desire by Savkar and Moreau to monitor the coating to optimize deposition of the coating and spraying conditions would apply whether the coating was thin or thick. As well, the thickness ranges of coating taught by Inoue show well known thickness applications when thermal plasma spraying which would be contemplated by Savkar and Moreau as both references are directed to the monitoring of thermal plasma spraying processes.

As to the rejection of claim 35, in response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it

must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Here the teaching of Yoshinaka is what is conventional in the art of plasma spraying.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER